DATA VALIDATION REPORT

Gold King Mine Release Incident LTM

SAMPLE DELIVERY GROUP: 680-120308-3

Prepared by

MEC^X
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I. INTRODUCTION

Task Order Title:	Gold King Mine Release Incident LTM
Project No.:	20408.012.001.0285.00
Sample Delivery Group:	680-120308-3
EPA Project Manager:	Steve Merritt
Weston Project Manager:	Mark Blanchard
TDD No.:	0001/1510-02
Matrix:	Water
QC Level:	Stage 2A
No. of Samples:	4
No. of Reanalyses/Dilutions:	0
Laboratory:	TestAmerica - Savannah

Table 1. Sample Identification

Location ID	*Lab Sample Name*	*Matrix Type*	*Collection Date*	*Method*
GSTO-C_12/08/15 (FILTERED)	680-120308-4	Water	12/8/15 12:40 PM	200.7, 200.8, 245.1
GSTO-C_12/08/15 (TOTALS)	680-120308-5	Water	12/8/15 12:40 PM	200.7, 200.8, 245.1
GSTO-C_12/17/15 (FILTERED)	680-120308-14	Water	12/17/15 12:15 PM	200.7, 200.8, 245.1
GSTO-C_12/17/15 (TOTALS)	680-120308-15	Water	12/17/15 12:15 PM	200.7, 200.8, 245.1

II. Sample Management

Anomalies regarding sample management are noted below. The samples were received within the temperature limits of 4°C ±2°C. The samples were received intact, on ice, and properly preserved. The chains-of-custody (COCs) were appropriately signed and dated by field and laboratory personnel. The presence or absence of custody seals on the cooler was not specifically noted.

The following issues were noted:

- The COCs did not list CLP sample IDs, and none were provided. The laboratory logged the samples per the location IDs on the COCs.
- The presence or absence of sample tags was not noted in the case narrative, and sample tags were not listed on the COCs.
- Samples were collected on December 8th and 17th but were not shipped to the laboratory until December 21st. No qualifications were required.

Data Qualifier Reference Table

Qualifier	Organics	Inorganics
U	The analyte was analyzed for, but was not detected above the reported sample quantitation limit. The associated value is the quantitation limit or the estimated detection limit for dioxins or PCB congeners.	The material was analyzed for, but was not detected above the level of the associated value. The associated value is either the sample quantitation limit or the sample detection limit. The associated value is the sample detection limit or the quantitation limit for perchlorate only.
UB	The analyte was detected in the sample and in either the associated laboratory blank or field blank. If detected below the reporting limit (RL) the analyte result was reported as non-detected at the RL due to blank contamination. If detected above the RL, the analyte result was reported as non-detected at the reported result due to blank contamination.	The analyte was detected in the sample and in either the associated laboratory blank or field blank. If detected below the reporting limit (RL) the analyte result was reported as non-detected at the RL due to blank contamination. If detected above the RL, the analyte result was reported as non-detected at the reported result due to blank contamination.
J	The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.	The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.
J+	Not applicable	The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample, and may have a potential positive bias.
J-	Not applicable	The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample, and may have a potential negative bias.

Qualifier	Organics	Inorganics
UJ	The analyte was not deemed above the reported sample quantitation limit. However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.	The material was analyzed for, but was not detected. The associated value is an estimate and may be inaccurate or imprecise.
UJB	The analyte was detected in the sample and in either the associated laboratory blank or field blank; the analyte result was reported as non-detected at either the RL or the reported result. The reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.	The analyte was detected in the sample and in either the associated laboratory blank or field blank; the analyte result was reported as non-detected at either the RL or the reported result. The reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.
N	The analysis indicates the presence of an analyte for which there is presumptive evidence to make a "tentative identification."	Not applicable.
NJ	The analysis indicates the presence of an analyte that has been "tentatively identified" and the associated numerical value represents its approximate concentration.	Not applicable.
R	The data are unusable. The sample results are rejected due to serious deficiencies in the ability to analyze the sample and to meet quality control criteria. The presence or absence of the analyte cannot be verified.	The data are unusable. The sample results are rejected due to serious deficiencies in the ability to analyze the sample and to meet quality control criteria. The presence or absence of the analyte cannot be verified.

Qualification Code Reference Table

Qualifier	Organics	Inorganics
H	Holding times were exceeded.	Holding times were exceeded.
S	Surrogate recovery was outside QC limits.	The sequence or number of standards used for the calibration was incorrect
C	Calibration %RSD or %D was noncompliant.	Correlation coefficient is <0.995 or calibration was noncompliant.
R	Calibration RRF was <0.05.	%R for calibration is not within control limits.
B	Presumed contamination as indicated by the preparation (method) blank results.	Presumed contamination as indicated by the preparation (method) or calibration blank results.
L	Laboratory Blank Spike/Blank Spike Duplicate %R was not within control limits.	Laboratory Control Sample %R was not within control limits.
L1	LCS/LCSD RPD was outside control limits.	LCS/LCSD RPD was outside control limits.
Q	MS/MSD recovery was poor.	MS recovery was poor.
Q1	MS/MSD RPD was outside control limits.	MS/MSD RPD was outside control limits.
E	Not applicable.	Duplicates showed poor agreement.
I	Internal standard performance was unsatisfactory.	ICP ICS results were unsatisfactory.
A	Not applicable.	ICP Serial Dilution %D were not within control limits.
M	Tuning (BFB or DFTPP) was noncompliant.	ICPMS tune was not compliant.
T	Presumed contamination as indicated by the trip blank results.	Not applicable.
+	False positive – reported compound was not present.	Not applicable.
-	False negative – compound was present but not reported.	Not applicable.
F	Presumed contamination as indicated by the FB or ER results.	Presumed contamination as indicated by the FB or ER results.
F1	Field duplicate results were outside the control limit.	Field duplicate results were outside the control limit.
$	Reported result or other information was incorrect.	Reported result or other information was incorrect.

Qualifier	Organics	Inorganics
?	TIC identity or reported retention time has been changed.	Not applicable.
D	The analysis with this flag should not be used because another more technically sound analysis is available.	The analysis with this flag should not be used because another more technically sound analysis is available.
P	Instrument performance for pesticides was poor.	Post Digestion Spike recovery was not within control limits.
*II, *III	Unusual problems found with the data that have been described in Section II, "Sample Management," or Section III, "Method Analyses." The number following the asterisk (*) will indicate the report section where a description of the problem can be found.	Unusual problems found with the data that have been described in Section II, "Sample Management," or Section III, "Method Analyses." The number following the asterisk (*) will indicate the report section where a description of the problem can be found.

III. Method Analyses

A. Contract Laboratory Program Statement of Work for Inorganic Superfund Methods, 200.7, 200.8, 245.1— Metals and Mercury

Reviewed By: M. Cherny
Date Reviewed: January 18, 2016

The samples listed in Table 1 for these analyses were validated based on the guidelines outlined in the *Quality Assurance Project Plan for U.S. EPA Region 8 CERCLA Site Assessment (2015)*, *Sampling and Analysis Plan/Quality Assurance Project Plan for Gold King Mine Release, Silverton, San Juan County, Colorado* (2015), *United States Environmental Protection Agency Contract Laboratory Program Statement of Work for Inorganic Superfund Methods, EPA Methods 200.7, 200.8, 245.1* and the *National Functional Guidelines for Inorganic Superfund Data Review* (2010).

- Holding Times: The analytical holding times, 28 days for mercury and six months for the remaining metals, were met.
- Analytical Method Blanks: There were no detects reported in the method blanks.
- Laboratory Control Samples (LCS): The recoveries were within laboratory control limits of 85-115%.
- Laboratory Duplicates: There were no laboratory duplicate analyses performed in this SDG.
- Matrix Spike/Matrix Spike Duplicate (MS/MSD): MS/MSD analyses were performed on sample GSTO-C_12/08/15 for the total 245.1 analysis. Recoveries are not evaluated when the sample results are greater than 4× the amount spiked. All applicable recoveries were within the laboratory control limits of 70-130% and the RPD was ≤20%. MEC^X evaluated method accuracy for the remaining metals based on the LCS results.
- Post Digestion Spike (PDS): PDS analyses were not performed on a sample in this SDG.
- Serial Dilution: Serial dilution analyses were not performed.
- Field QC Samples: MEC^X evaluated field quality control (QC) samples, and if necessary, qualified based on method blanks and other laboratory QC results affecting the usability of the field QC data. MEC^X used the remaining detects to evaluate the associated site samples. Findings associated with field QC samples are summarized below:
    - Field Blanks and Equipment Rinsates: Field blank or equipment blank samples were not identified for this SDG.
    - Field Duplicates: There were no field duplicate pairs identified in this SDG.

Validated Sample Result Forms: 680-120308-3

Analysis Method 200.7 Rev 4.4

Sample Name GSTO-C_12/17/15 (FILTERED) **Matrix Type:** Water

Lab Sample Name: 680-120308-14 **Sample Date:** 12/17/2015 12:15:00 PM

Analyte	Total/Dissolved	CAS No	Result Value	Reporting Limit	MDL	Result Units	Lab Qualifier	Validation Qualifier	Validation Notes
Aluminum, Dissolved	D	7429-90-5	210	200	24	ug/L			
Calcium, Dissolved	D	7440-70-2	430000	500	25	ug/L			
Iron, Dissolved	D	7439-89-6	32	50	17	ug/L	J	J	
Magnesium, Dissolved	D	7439-95-4	17000	500	33	ug/L			
Potassium, Dissolved	D	7440-09-7	1800	1000	17	ug/L			
Sodium, Dissolved	D	7440-23-5	5500	1000	480	ug/L			

Sample Name GSTO-C_12/17/15 (TOTALS) **Matrix Type:** Water

Lab Sample Name: 680-120308-15 **Sample Date:** 12/17/2015 12:15:00 PM

Analyte	Total/Dissolved	CAS No	Result Value	Reporting Limit	MDL	Result Units	Lab Qualifier	Validation Qualifier	Validation Notes
Aluminum	T	7429-90-5	350	200	24	ug/L			
Calcium	T	7440-70-2	440000	500	25	ug/L			
Iron	T	7439-89-6	560	50	17	ug/L			
Magnesium	T	7439-95-4	17000	500	33	ug/L			
Potassium	T	7440-09-7	2000	1000	17	ug/L			
Sodium	T	7440-23-5	5300	1000	480	ug/L			

Sample Name GSTO-C_12/08/15 (FILTERED) **Matrix Type:** Water

Lab Sample Name: 680-120308-4 **Sample Date:** 12/8/2015 12:40:00 PM

Analyte	Total/Dissolved	CAS No	Result Value	Reporting Limit	MDL	Result Units	Lab Qualifier	Validation Qualifier	Validation Notes
Aluminum, Dissolved	D	7429-90-5	240	2000	240	ug/L	U	U	
Calcium, Dissolved	D	7440-70-2	410000	5000	250	ug/L			
Iron, Dissolved	D	7439-89-6	170	500	170	ug/L	U	U	
Magnesium, Dissolved	D	7439-95-4	15000	5000	330	ug/L			
Potassium, Dissolved	D	7440-09-7	790	10000	170	ug/L	J	J	
Sodium, Dissolved	D	7440-23-5	8900	10000	4800	ug/L	J	J	

Sample Name GSTO-C_12/08/15 (TOTALS) **Matrix Type:** Water

Lab Sample Name: 680-120308-5 **Sample Date:** 12/8/2015 12:40:00 PM

Analyte	Total/Dissolved	CAS No	Result Value	Reporting Limit	MDL	Result Units	Lab Qualifier	Validation Qualifier	Validation Notes

Analysis Method 200.7 Rev 4.4

Aluminum	T	7429-90-5	830	200	24	ug/L			
Calcium	T	7440-70-2	450000	500	25	ug/L			
Iron	T	7439-89-6	420	50	17	ug/L			
Magnesium	T	7439-95-4	16000	500	33	ug/L			
Potassium	T	7440-09-7	2000	1000	17	ug/L			
Sodium	T	7440-23-5	5700	1000	480	ug/L			

Analysis Method 200.8

Sample Name GSTO-C_12/17/15 (FILTERED) **Matrix Type:** Water

Lab Sample Name: 680-120308-14 **Sample Date:** 12/17/2015 12:15:00 PM

Analyte	Total/Dissolved	CAS No	Result Value	Reporting Limit	MDL	Result Units	Lab Qualifier	Validation Qualifier	Validation Notes
Antimony, Dissolved	D	7440-36-0	0.4	1	0.4	ug/L	U	U	
Arsenic, Dissolved	D	7440-38-2	0.37	1	0.37	ug/L	U	U	
Barium, Dissolved	D	7440-39-3	44	2	0.14	ug/L			
Beryllium, Dissolved	D	7440-41-7	0.15	0.4	0.15	ug/L	U	U	
Cadmium, Dissolved	D	7440-43-9	4.6	0.5	0.043	ug/L			
Chromium, Dissolved	D	7440-47-3	1	2	1	ug/L	U	U	
Cobalt, Dissolved	D	7440-48-4	12	0.4	0.12	ug/L			
Copper, Dissolved	D	7440-50-8	6	1	0.5	ug/L	^		
Lead, Dissolved	D	7439-92-1	0.06	0.3	0.06	ug/L	U	U	
Manganese, Dissolved	D	7439-96-5	17000	2.5	1.2	ug/L	E		
Molybdenum, Dissolved	D	7439-98-7	1.6	1	0.45	ug/L			
Nickel, Dissolved	D	7440-02-0	15	1	0.4	ug/L			
Selenium, Dissolved	D	7782-49-2	0.58	2	0.58	ug/L	U	U	
Silver, Dissolved	D	7440-22-4	0.1	1	0.1	ug/L	U	U	
Thallium, Dissolved	D	7440-28-0	0.1	0.2	0.1	ug/L	U	U	
Vanadium, Dissolved	D	7440-62-2	0.3	1	0.3	ug/L	U	U	
Zinc, Dissolved	D	7440-66-6	240	20	2.8	ug/L			

Sample Name GSTO-C_12/17/15 (TOTALS) **Matrix Type:** Water

Lab Sample Name: 680-120308-15 **Sample Date:** 12/17/2015 12:15:00 PM

Analyte	Total/Dissolved	CAS No	Result Value	Reporting Limit	MDL	Result Units	Lab Qualifier	Validation Qualifier	Validation Notes
Antimony	T	7440-36-0	0.4	1	0.4	ug/L	U	U	
Arsenic	T	7440-38-2	0.37	1	0.37	ug/L	U	U	
Barium	T	7440-39-3	8.6	2	0.14	ug/L			
Beryllium	T	7440-41-7	0.15	0.4	0.15	ug/L	U	U	
Cadmium	T	7440-43-9	4.5	0.5	0.043	ug/L			
Chromium	T	7440-47-3	1	2	1	ug/L	U	U	
Cobalt	T	7440-48-4	11	0.4	0.12	ug/L			

Analysis Method 200.8

Copper	T	7440-50-8	26	1	0.5	ug/L	^	
Lead	T	7439-92-1	0.28	0.3	0.06	ug/L	J	J
Manganese	T	7439-96-5	16000	2.5	1.2	ug/L	E	
Molybdenum	T	7439-98-7	1.5	1	0.45	ug/L		
Nickel	T	7440-02-0	15	1	0.4	ug/L		
Selenium	T	7782-49-2	0.58	2	0.58	ug/L	U	U
Silver	T	7440-22-4	0.1	1	0.1	ug/L	U	U
Thallium	T	7440-28-0	0.16	0.2	0.1	ug/L	J	J
Vanadium	T	7440-62-2	0.3	1	0.3	ug/L	U	U
Zinc	T	7440-66-6	260	20	2.8	ug/L		

Sample Name GSTO-C_12/08/15 (FILTERED) **Matrix Type:** Water

Lab Sample Name: 680-120308-4 **Sample Date:** 12/8/2015 12:40:00 PM

Analyte	Total/Dissolved	CAS No	Result Value	Reporting Limit	MDL	Result Units	Lab Qualifier	Validation Qualifier	Validation Notes
Antimony, Dissolved	D	7440-36-0	4	10	4	ug/L	U	U	
Arsenic, Dissolved	D	7440-38-2	3.7	10	3.7	ug/L	U	U	
Barium, Dissolved	D	7440-39-3	110	20	1.4	ug/L			
Beryllium, Dissolved	D	7440-41-7	1.5	4	1.5	ug/L	U	U	
Cadmium, Dissolved	D	7440-43-9	0.65	5	0.43	ug/L	J	J	
Chromium, Dissolved	D	7440-47-3	10	20	10	ug/L	U	U	
Cobalt, Dissolved	D	7440-48-4	3.3	4	1.2	ug/L	J	J	
Copper, Dissolved	D	7440-50-8	12	10	5	ug/L			
Lead, Dissolved	D	7439-92-1	0.6	3	0.6	ug/L	U	U	
Manganese, Dissolved	D	7439-96-5	8100	25	12	ug/L			
Molybdenum, Dissolved	D	7439-98-7	4.5	10	4.5	ug/L	U	U	
Nickel, Dissolved	D	7440-02-0	12	10	4	ug/L			
Selenium, Dissolved	D	7782-49-2	5.8	20	5.8	ug/L	U	U	
Silver, Dissolved	D	7440-22-4	1	10	1	ug/L	U	U	
Thallium, Dissolved	D	7440-28-0	1	2	1	ug/L	U	U	
Vanadium, Dissolved	D	7440-62-2	3	10	3	ug/L	U	U	
Zinc, Dissolved	D	7440-66-6	120	200	28	ug/L	J	J	

Sample Name GSTO-C_12/08/15 (TOTALS) **Matrix Type:** Water

Lab Sample Name: 680-120308-5 **Sample Date:** 12/8/2015 12:40:00 PM

Analyte	Total/Dissolved	CAS No	Result Value	Reporting Limit	MDL	Result Units	Lab Qualifier	Validation Qualifier	Validation Notes
Antimony	T	7440-36-0	0.4	1	0.4	ug/L	U	U	
Arsenic	T	7440-38-2	0.37	1	0.37	ug/L	U	U	
Barium	T	7440-39-3	8	2	0.14	ug/L			
Beryllium	T	7440-41-7	0.15	0.4	0.15	ug/L	U	U	

Analysis Method 200.8

Cadmium	T	7440-43-9	1.8	0.5	0.043	ug/L		
Chromium	T	7440-47-3	1	2	1	ug/L	U	U
Cobalt	T	7440-48-4	4	0.4	0.12	ug/L		
Copper	T	7440-50-8	26	1	0.5	ug/L		
Lead	T	7439-92-1	0.14	0.3	0.06	ug/L	J	J
Manganese	T	7439-96-5	9100	2.5	1.2	ug/L	E	
Molybdenum	T	7439-98-7	1.3	1	0.45	ug/L		
Nickel	T	7440-02-0	9.8	1	0.4	ug/L		
Selenium	T	7782-49-2	0.58	2	0.58	ug/L	U	U
Silver	T	7440-22-4	0.1	1	0.1	ug/L	U	U
Thallium	T	7440-28-0	0.15	0.2	0.1	ug/L	J	J
Vanadium	T	7440-62-2	0.3	1	0.3	ug/L	U	U
Zinc	T	7440-66-6	130	20	2.8	ug/L		

Analysis Method 245.1

Sample Name GSTO-C_12/17/15 (FILTERED) **Matrix Type:** Water

Lab Sample Name: 680-120308-14 **Sample Date:** 12/17/2015 12:15:00 PM

Analyte	Total/Dissolved	CAS No	Result Value	Reporting Limit	MDL	Result Units	Lab Qualifier	Validation Qualifier	Validation Notes
Mercury, Dissolved	D	7439-97-6	0.08	0.2	0.08	ug/L	U	U	

Sample Name GSTO-C_12/17/15 (TOTALS) **Matrix Type:** Water

Lab Sample Name: 680-120308-15 **Sample Date:** 12/17/2015 12:15:00 PM

Analyte	Total/Dissolved	CAS No	Result Value	Reporting Limit	MDL	Result Units	Lab Qualifier	Validation Qualifier	Validation Notes
Mercury	T	7439-97-6	0.08	0.2	0.08	ug/L	U	U	

Sample Name GSTO-C_12/08/15 (FILTERED) **Matrix Type:** Water

Lab Sample Name: 680-120308-4 **Sample Date:** 12/8/2015 12:40:00 PM

Analyte	Total/Dissolved	CAS No	Result Value	Reporting Limit	MDL	Result Units	Lab Qualifier	Validation Qualifier	Validation Notes
Mercury, Dissolved	D	7439-97-6	0.8	2	0.8	ug/L	U	U	

Sample Name GSTO-C_12/08/15 (TOTALS) **Matrix Type:** Water

Lab Sample Name: 680-120308-5 **Sample Date:** 12/8/2015 12:40:00 PM

Analyte	Total/Dissolved	CAS No	Result Value	Reporting Limit	MDL	Result Units	Lab Qualifier	Validation Qualifier	Validation Notes
Mercury	T	7439-97-6	0.08	0.2	0.08	ug/L	U	U	